

17.5.1 ODH Field Calibration Procedure

1. Purpose

This specification, in conjunction with associated drawing(s) and other applicable documents, defines the periodic calibration requirements for the ODH System.

2. Responsibilities

- 2.1 The RHIC Safety Systems Section Head shall ensure that this procedure is executed at no greater than 1 year intervals and review the test results as shown on Attachment 1 for completeness and correctness.
- 2.2 Persons calibrating ODH systems are responsible for conducting this procedure. The calibration procedure is done in place and requires two qualified technicians. Qualification of test personnel shall be determined by the RHIC Safety Systems Section Head. The Data sheet listed in Attachment 1 shall be completed as called out in the procedure.

3. Prerequisites

3.1 Equipment Calibration

All equipment used in calibrating the ODH system shall have a calibration sticker that has a calibration date which has not expired.

3.2 Required Equipment

Gastech OX-95 Oxygen Monitor, or equivalent
Calibrated Fluke Model 77 Voltmeter (or equivalent)
Barometer
Compressed Air Bottle
S-keys, as dispensed from point of issue

3.3 Required Documents (for reference only)

Schematic Diagram ODH Pre-Amp C1015006
Printed Wiring Board Assembly ODH Pre-Amp C1015008
Schematic Diagram ODH Electronics Board C1010001

3.4 Training

RWT-002, Rad Worker 1
RHIC Access Safety Training

4. Precautions

None

5. Procedure

5.1 ODH Calibration Procedure

- 5.1.1 Since the sensor output voltage is sensitive to barometric pressure the calibration shall be done using a correction factor which is based on the current value of the local ambient barometric pressure. Obtain the present barometric pressure from Meteorology at extension 2263, or on the Worldwide Web at <http://rolly.ccd.bnl.gov/~thealy/wxnew.shtml>. Since the sensor response is linear with changes in barometric pressure, the correction factor is determined by the formula: Corrected oxygen level=(current barometer /29.7) x 20.9. Record the time and present barometric pressure at both the beginning and end of the calibration period on the data sheet. Also record the correction factor as determined by the above formula. Prior to beginning the calibration procedure, and while outside the tunnel enclosure and in a known helium-free atmosphere, set the GASTECH OX-95 OXYGEN MONITOR to an ambient oxygen reading of 20.9%.
- 5.1.2 Locate the ODH sensor that requires calibration. Technician 1 shall hold the pre-set GASTECH OX-95 OXYGEN MONITOR using manlift or remote tubing at Sector 2 next to the Ke-25 oxygen cell in the ODH system being calibrated. To ensure that the ambient atmosphere at the sensor is normal, the OX-95 shall read 20.9%. Technician 2 shall record the OX-95 reading on the data sheet. In the event the OX-95 does not read 20.9%, notify the ES&H Coordinator and the Safety System Section Head then use the bottle of compressed air to clear the air around the sensors until the OX-95 reads 20.9%.
- 5.1.3 Technician 2 shall proceed to the crash box associated with the sensor being calibrated and set the switch on the front of the crash box to DIV "A". While technician 2 monitors the display on the crash box technician 1 shall adjust potentiometer R6 on the Division "A" pre-amp board until the readout on the crash box displays a value corresponding to the barometrically corrected reading as determined in Para 5.1.1. Technician 2 shall record the actual reading on the data sheet.
- 5.1.4 While still at the crash box under test, Technician 2 shall set the switch on the front of the crash box to DIV "B". While Technician 2 monitors the display on the crash box, Technician 1 shall adjust potentiometer R6 on the Div "B" pre-amp board until the readout on the crash box 2 displays a value corresponding to the barometrically corrected reading as determined

in Para 5.1.1. Technician 2 shall record the actual reading on the data sheet.

- 5.1.5 Technician 2 shall attach the positive lead of the voltmeter to tp2 and the negative lead of the voltmeter to tp4 on the Division “A” electronics board inside the crash box. Technician 2 shall record the reading on the data sheet.
- 5.1.6 Technician 2 shall move the positive and negative lead of the voltmeter from Division “A” electronics board tp2 and tp4 to tp2 and tp4 on the Division “B” electronics board. Technician 2 shall record the reading on the data sheet.
- 5.1.7 Technician 2 shall attach the positive lead of the voltmeter to tp1 and the negative lead of the voltmeter to tp4 on the Division “A” electronics board inside the crash box. The voltmeter reading shall be 1.199 +/- 10mv (**exception** STAR Stand Alone shall be 1.299 +/- 10mv), (1.299 = 19.5%) use potentiometer R35 for adjustment, if necessary. Technician 2 shall record the reading on the data sheet.
- 5.1.8 Technician 2 shall move the positive and negative lead of the voltmeter from Division “A” electronics board tp1 and tp4 to tp1 and tp4 on the Division “B” electronics board. Note that the voltmeter reading shall be 1.199 +/- 10mv (**exception** STAR Stand Alone shall be 1.299 +/- 10mv), use potentiometer R35 for adjustment, if necessary. Technician 2 shall record the reading on the data sheet.
- 5.1.9 At completion of test, contact Meteorology to obtain the current barometric pressure. Record the time and barometric pressure on the data sheet.

6. **Documentation**

Attachment 1 shall be completed by a member of the RHIC Safety Systems Section. A copy of Attachment 1, for each subsystem calibrated, shall be kept by the RHIC Safety Systems Section Head for future reference or auditing purposes.

7. **References**

None

8. **Attachments**

- 8.1 [C-A-OPM-ATT 17.5.1.a “ODH Field Calibration Test and Calibration Data Sheet”](#).